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Agricultural Credit Accessibility and Rice Production in Savelugu-Nanton and Walewale Districts of Northern Ghana

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Abstract
As Ghana struggles to achieve accelerated growth in food production, increasing the output of rice has become an important goal. The main aim of this study is to find out the determinants of agricultural credit accessibility and its effect on rice output. The study was conducted in four communities in the Savelugu-Nanton District and two communities in the Walewale District. It was aimed at ascertaining the determinants of agricultural credit accessibility and its impact on rice output. In all, a sample of 90 rice farmers was interviewed using a semi-structured questionnaire as well as focus group discussions. Data was collected on the mode of operation of existing credit institutions in the districts, the socio-economic indicators of farmers believed to influence credit accessibility and the inputs and output of farmers in the 2008/2009 farming season. Out of the 90 rice farmers interviewed, only 37 received agricultural credit from Bangmarigu Community Rural Bank and MoFA. In addition, most of the farmers were not aware of the existing credit institutions while others did not access the credit due to high interest rate, small credit size, fear of indebtedness and low educational status. From the survey, it became known that agricultural credit accessibility is positively influenced by group membership, farm size and gender. Specifically females had greater average of credit than males. The study revealed that, agricultural credit has a significant effect on rice output hence the need to seek for credit to increase production levels. It is recommended that farmers are sensitized on the existence of credit institutions. Also credit institutions should institute measures to reduce interest rate and also make credit acquisition processes and repayment plans simple and flexible.
Key words: Credit accessibility, Determinants of credit, Cobb-douglas production function and Correlation

1. Introduction

Credit is defined as "the process of obtaining control over the use of money, goods and services in the present in the exchange for a promise to repay at a future date" (Adegeye and Dittoh, 1985; Pp 147).
The provision of credit has increasingly been regarded as an important tool for raising the incomes of rural populations, mainly by mobilizing resources to more productive uses. Norton *et al.,* (2010) say that access to credit becomes important as a developing country moves from traditional to modern agriculture. Credit helps farmers purchase inputs such as seeds, fertilizers, and chemicals. It facilitates purchase of durable productive inputs such as machinery and helps households better manage their resources. Without credit, even high – return investments, long -or short- term, would be infeasible for many farmers. Loans enable farmers to better manage risks since they can borrow during bad years and pay back the loans during good years. Credit is critical for the adoption of new technologies.
Agricultural credit is very significant in averting poverty and increasing agricultural productivity when applied efficiently. Isiorhovoja *et al.,* (2009) stress that credit is a prerequisite for any forward- looking economic activity; and accessibility to credit facilitates the acquisition and application of state of the art technology and enables such enterprise to be in the driving seat in technology application.
According to Godwin (1997) though credit involves some form of risk, it is a way of life in today's world of specialization and is essential to the maintenance of efficiency.
Yunus (1975) in Al-hassan and Bambangi (2006) stated that, one single action which will enable the poor to overcome their poverty is credit. Credit averts ruins, which would have occurred due to inadequate financing. In addition, agricultural credit enhances productivity and promotes standard of living by breaking vicious cycle of poverty of small-scale farmers (Adebayo et al 2008). In addition, credit systems enable the poor countries to enjoy certain standards of living through importation of goods and services (Badu, 1994).

Rice is the single most important food crop and a primary food crop for more than a third of the world's population. In most countries, rice is a subsistence crop with about half of the harvest retained and consumed by farm households. Africa produces less than two-thirds (2/3) of what Vietnam produces (Gurdev and Gary, 1991). Rice is an important food crop in Ghana and its consumption is growing, particularly among urban dwellers. Rice contributes about 9% of the food requirements in the country. The importance of rice in the Ghanaian economy is also seen in its contribution to agricultural GDP and employment. As Ghana struggles to achieve accelerated growth in food production, increasing the output of rice has become an important goal.

The strategic nature of rice has long drawn the attention of policy makers who view promoting domestic rice production as a means of reducing dependency on imports, lowering the pressure on foreign currency reserves, ensuring stable and low-price sources of food for people, and generating employment and income for rice growers (Randolph, 1995).

According to ISSER (2005), the development of the local rice industry is one of the five priority areas in the GPRS. The policy of MoFA is to support an increase in the local rice production in order to reduce imports by about 30%. Apart from the Aveyime and Botanga irrigation farms, Savelugu-Nanton and Walewale are also into small-scale rice production that need some form of financial support to enable them produce to feed the nation.
Rice is a grain crop which needs certain inputs such as fertilizers and pesticides to enable it yield to its maximum during its growth phase. The potential of credit is increasingly being recognized as one way of realizing increased agriculture production among small-scale farmers. This has given rise to the intense involvement of development agencies and governments of developing countries in the promotion of agricultural credit institutions. Like many others, governments of West Africa have recognized the role credit can play in agricultural production and have established a number of special agencies to provide agricultural credit to farmers.
In Ghana for instance, ADB, as well as other co-operative banks and government owned banks such as MASLOC, Venture Capital Trust Fund administers credit to farmers. However, credit systems are not without problems in a developing country like Ghana, where assessment of credit is difficult perhaps due to the fact that most beneficiaries lack the right collateral for the assessment process.

Lack of credit is one of the key constraints in agricultural production. Internal factors limiting credit access are lack of or poor quality farm assets, lack of ownership of assets for women farmers, poor financial management, and risky nature of farming and inability of clients to prepare viable project proposals. External factors are high interest rates; high cost of service delivery to the sector, and perception of financial service providers about farming as being highly risky (FASDEP II 2009). Again, there is high interest rate on the loans, which discourages borrowing.
Apart from these, substantial barriers in credit market exist in developing countries in the informal sectors, which hamper borrowing. In many cases, high risk of default, misuse of credit facilities, extravagance and lack of regular money income restrain financial intermediaries from giving out loans (Badu, 1994).

In Ghana, it is sad to notice that most farmers all over the country lack access to credit facilities, notably among them are rice farmers in Savelugu-Nanton and Walewale districts of northern Ghana. Meanwhile many credit schemes from both formal and informal institutions exist in the Northern Region; which is considered one of the most deprived in the country. This is consistent to Zeller *et al. (*1997) that policy makers agree generally that poor people in developing countries lack access to credit facilities.
Accessibility to credit is said to have occurred when the individual enlists with a credit institution and actually borrows. On the other hand, lack of access to credit is said to occur when a person makes concerted efforts to acquire credit without success. The premise is that, rural households can improve upon their main source of livelihood (mainly farming, if they have access to small loans (Ayamga, 2006).
According to Feder *et al*., (1985) with the provision of credit, the cost of technology (capital intensive) and assets will be reduced relative to family labour. Thus, instead of growing low yielding local varieties, with low level of fertilizer, access to credit may allow for the use of improved varieties, fertilizer and high yield per unit labour and land.
Therefore, this paper attempts to contribute to the improvement of credit accessibility by examining or analyzing the determinants of credit accessibility and its impact on output.

2 Materials and Methods

The study was conducted in Savelugu-Nanton District and Walewale District in the Northern Region of Ghana. In all ninety (90) respondents were interviewed, fifteen (15) each from Janga and Yama in Walewale district and fifteen (15) from Kanshegu, Nyoglo, Mohi-Fong and Kpalyogo in Savelugu-Nanton district using simple random sampling procedure. This probability sampling procedure was used to select farmers from rice producing communities in the districts. Both qualitative and quantitative data were taken from rice farmers.
Both primary and secondary data were collected. The primary data was collected from rice farmers while secondary data was taken from Bangmarigu Community Rural Bank.
Structured and semi-structured interviews, focus group discussions, checklist and observations were deployed.
Correlation analysis was done to test the significant levels of the relationship between some socio-economic indicators and agricultural credit accessibility. Pivot table facility in Microsoft Excel was used to

analyze credit accessibility data. In finding out the effects of agricultural credit on rice output a Cobb-Douglas production function was estimated by the OLS.

2.1 Theoretical Explanation of Cobb-Douglas production function

Many studies have employed the Cobb-Douglas production function to estimate the effects of a given set of inputs on output due to its simplicity and flexibility. Baiden (1998) employed the Cobb-Douglas productions to investigate the determinants of agricultural output using the OLS.
Also, in analyzing the efficiency of resource use among three rice production systems Olagoke (1991) employed the Cobb-Douglas production function. The general form of a Cobb-Douglas production function is specified as:

$$Y = AX_1^{\alpha} X_2^{\beta} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where Y is the quantity of output in physical units, Xs are explanatory variables and

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A is an efficiency parameter reflecting the level of technology. That is the efficiency in the organization of factors of production is measured by the coefficient A.
Whereas α and β are parameters that represent the output elasticities.
A strict Cobb -Douglas function in which $\alpha + \beta = 1$, exhibits constant returns to scale. A generalized Cobb-Douglas function in which $\alpha + \beta \neq 1$, exhibits increasing returns to scale if $\alpha + \beta > 1$ and decreasing returns to scale if $\alpha + \beta < 1$

2.2 Empirical model

The main objective of the study is to find out the determinants of agricultural credit accessibility and its effect on output. Since we wish to measure the effect of agricultural credit accessibility on output there is the need to estimate a production function that involves land, fertilizer and credit as the explanatory variables and output (Y) as follows:

$$In\, Y_i = \beta_0 + \beta_1 InX_{1i} + \beta_2 InX_{2i} + \beta_3 InX_{3i} + U_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

$Y_i = Output\ level\ of\ rice$
$\beta_0 = Efficiency\ paramater$
$U_i = Stochastic\ disturbance\ term$
$X_1 = Farm\ size$
$X_2 = Fertilizer$
$X_3 = Credit$
$When\ \beta_1 + \beta_2 + \beta_3 = 1\ means\ constant\ returns\ to\ scale$
$When\ \beta_1 + \beta_2 + \beta_3 > 1\ it\ means\ increase\ returns\ to\ scale$
$When\ \beta_1 + \beta_2 + \beta_3 < 1\ means\ decreasing\ returns\ to\ scale$

3. RESULTS AND DISCUSSIONS

Mode of operation of the credit institutions

The survey revealed that, MiDA administered agricultural credit through Bangmarigu Community Rural Bank in Walewale to some category of farmers namely rice farmers, and maize farmers among others. Furthermore, farmers from Savelugu-Nanton received credit in the form of rice seeds from MoFA during the 2009 cropping season.

3.1 Conditions required before credit is granted by Bangmarigu Rural Bank

The following were the conditions that must be satisfied to access loan.

- Group formation: It is required that various crop farmers form groups to enable the credit institutions grant them the loans. Meaning that a farmer cannot access credit if he/she does not belong to a group.
- Operational account: Here, every member of the group must have an active/operational account with the bank. This facilitates one's access to credit.
- The group should be an active one by having regular meetings: The group is not a dominant one but should have frequent meetings to deliberate on matters affecting them and the way forward.
- Finally, the group is supposed to have a good credit history: That is the bank must have an evidence or written document showing that the group is not owing any bank. More importantly, group members should have the ability to repay credit on time.

- In the case of MoFA, they considered farm size and group memberships before rice seeds were given to farmers.

3.2 Application procedure for credit

When the above stipulated conditions are met, the group is required to provide a crop calendar, budget and cash flow to the financial committee of the credit institution for appraisal by the project manager, managing director and the board of directors. When the business plan of the applicants is approved, a commitment fee of 5% is paid on the amount of loan/credit before the application is finally approved.

3.3 Period of disbursement and interest rate

According to the Bangmarigu Community Rural Bank, applicants are required to pay an interest rate of 28% in addition to the commitment fee of 5%. Loans are approved and disbursed within a period of two to four weeks.

3.4 Mode of Repayment

Farmers pay the loans through the group secretary within five months installment. A grace period of two months is given when beneficiaries are not able to repay the loan within the stipulated time.

3.5 Access and non-access to Agricultural credit

Out of the 90 farmers interviewed only 37 had access to agricultural credit while 53 of the farmers had no access to agricultural credit. This was due to reasons such as unawareness of existing credit scheme, high interest rate, and fear of indebtedness (Fig 1).

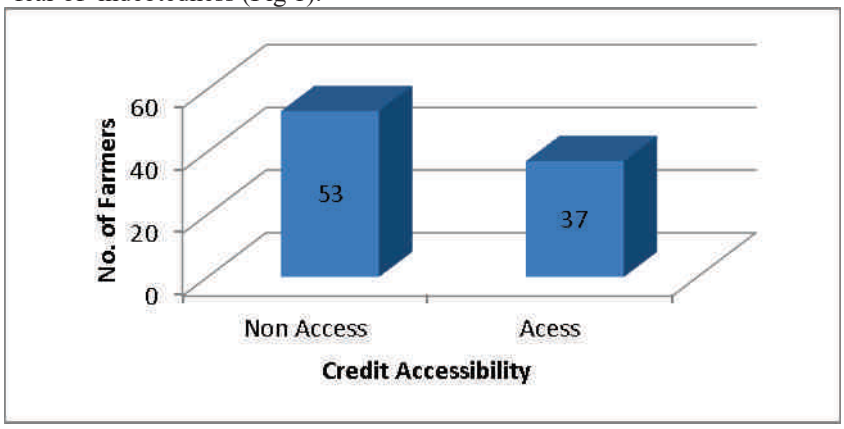

Fig 1: Access to credit

3.6 Amount of Credit received by Farmers from the two Districts

Out of the 37 farmers who had access to agricultural credit, farmers from Walewale received higher amount than farmers from Savelugu-Nanton. On the average, Walewale farmers received as much as GH¢252.00 while farmers from Savelugu-Nanton received GH¢13.00. Fig 2

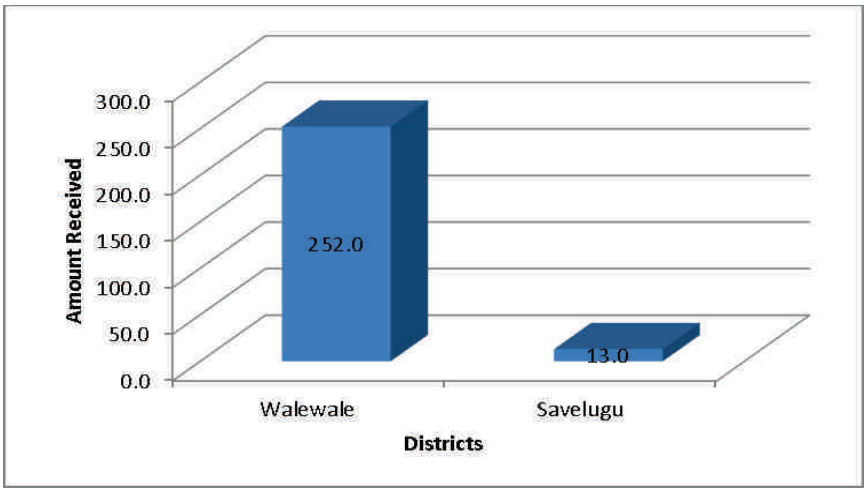

Fig 2: Amount of credit by Farmers from the two Districts.

3.7 Correlation Analysis

Table 1: Results of Pearson Correlation Analysis

Credit	Gender	Education	Age	Household size	Group membership	Farm size
Correlation coefficient	-.557	.054	.188	.074	.783**	.266*
Sig.(2-tailed	.000	.613	.076	.487	.000	.011
N	90	90	90	90	90	90

	Gender	Educ.	Credit	Age	HHsize	Group	Farm size
Gender Pearson Correlation	1	.025	-.557**	-.024	.106	-.486**	.085
Sig.(2-tailed N	90	.817 90	.000 90	.826 90	.322 90	.000 90	.424 90
Education Pearson Correlation	.025	1	.054	-.250*	-.235*	-.007	-.120
Sig.(2-tailed N	.817 90	90	.613 90	.018 90	.026 90	.949 90	.260 90
Credit Pearson Correlation	-.557	.054	1	.188	.074	.783**	.266*
Sig.(2-tailed N	.000 90	.613 90	90	.076 90	.487 90	.000 90	.011 90
Age Pearson Correlation	-.024	-.250*	.188	1	.660**	.113	.412**
Sig.(2-tailed N	.826 90	.018 90	.076 90	90	.000 90	.290 90	.000 90
HHsize Pearson Correlation	.106	-.235*	.074	.660**	1	.025	.379**
Sig.(2-tailed N	.322 90	.018 90	.487 90	.000 90	90	.816 90	.000 90
Group Pearson Correlation	-.486**	-.007	-.007	.113	.025	1	.228*
Sig.(2-tailed N	.000 90	.949 90	.949 90	.290 90	.816 90	90	.031 90
Farm size Pearson Correlation	.085	-.120	-.120	.412**	.379**	.228*	1
Sig.(2-tailed N	.424 90	.260 90	.260 90	.000 90	.000 90	.031 90	90

**. Correlation is significant at the 0.01 and * 0.05 level (2-tailed) respectively.

3.8 Determinants of Agricultural credit accessibility

Gender and Agricultural credit Accessibility

On the average, the females received GH¢ 246.00 while the males received GH¢ 221.00. The difference in the average amount of credit received is confirmed by the correlation coefficient between gender and credit accessibility in table 1. The coefficient is -0.56 and it is significant at 1 %. This disagrees with Akudugu et al (2009) who found that credit supply to women was 18 % against 19 % of men. This implies that the credit institutions grant more loans to the women than the men. In other words, the quantum of credit received is sensitive to towards the feminine.

Educational level of Farmers and Agricultural Credit Accessibility

Generally, the level of education in the two districts is low. However, farmers who had access to agricultural credit had higher level of education than those who did not have access to agricultural credit. On the average

farmers who had access to agricultural credit spent an average of 1.7 years in formal education while those who received no agricultural credit spent 1.3 years in formal education. Clearly the difference is not much and this is confirmed by the correlation coefficient of .05 and the fact that it is insignificant at both 1 % and 5 % , means that the degree of association between education and agricultural credit is weak (Table 1).

The result is in contrast with the findings of Pudasaini (1983) that education enables farmers to select improved inputs and optimally allocates existing and new inputs among competing uses. This is also in consistent with the observations of Nwaru (2005) that an educated farmer, other things being equal, allocates farm resources more efficiently.

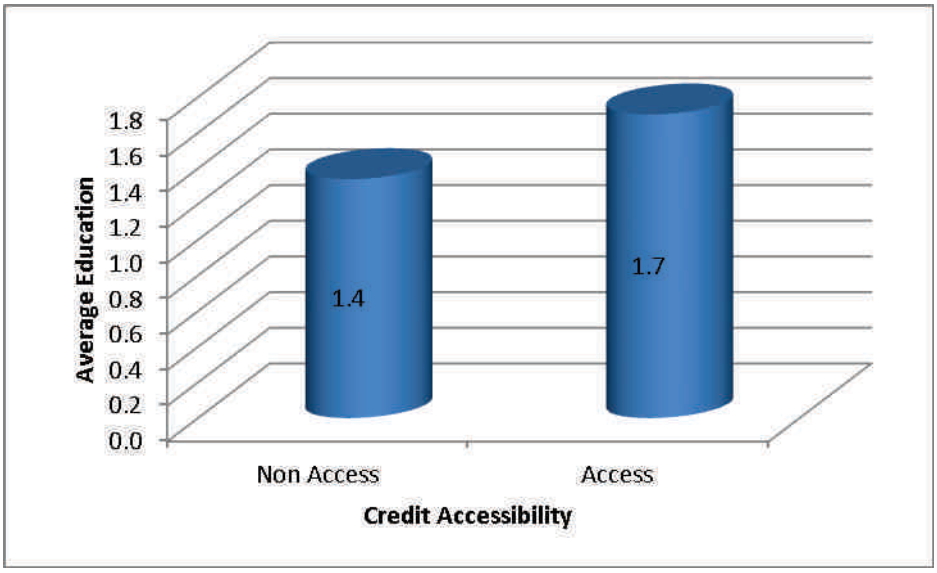

Figure 3: Credit Accessibility by Formal Education

3.9 Age of Farmers and Agricultural credit Accessibility

On the average, farmers who had agricultural credit were older than those who did not have agricultural credit. Farmers who had access to agricultural credit were averagely 39 years while those who did not have access to agricultural credit were on the average 35 years. Obviously the disparity is not much and this is confirmed by the correlation coefficient of 0.19 and the fact that it is insignificant means that there is a weak association between age of farmers and credit accessibility. This agrees with the studies of Polson and Speneer (1992) which states that younger farmers are more adventurous and inclined to accept innovations than older ones.

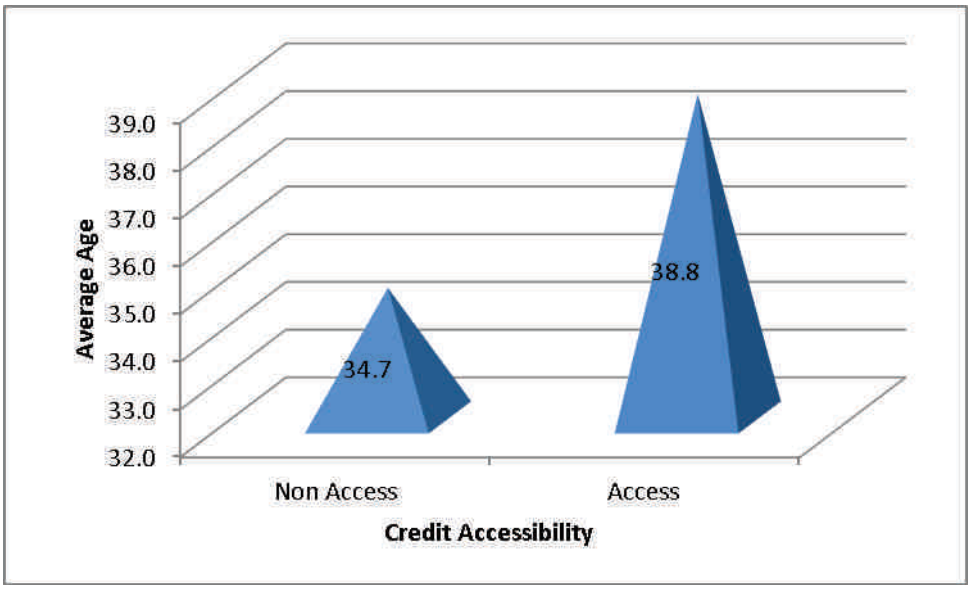

Figure 4: Credit Accessibility by Age of farmers

3.10 Household size of Farmers and Agricultural credit Accessibility

The study also revealed that, farmers with large household size value of 8.3 had access to agricultural credit whilst those with household size value of 7.6 did not have access to agricultural credit. Clearly the difference is not much and this is confirmed by the correlation coefficient of 0.07 and it is not surprising that it is insignificant at 1 % and 5 %. This is in line with Oboh and Ekpebu (2011) that credit allocation to the farm sector decreases with increasing household size. It is also in agreement with the findings of Mejeha (2005) in which farmers with high household sizes tended to divert their loans for the sustenance and upkeep of family member

This disagrees with the studies of Ayamga *et al.,* (2006) that large households tend to spend more on food and other basic household requirements. The high expenditure associated with larger households will make them resource constrained hence the need for credit (Fig 5).

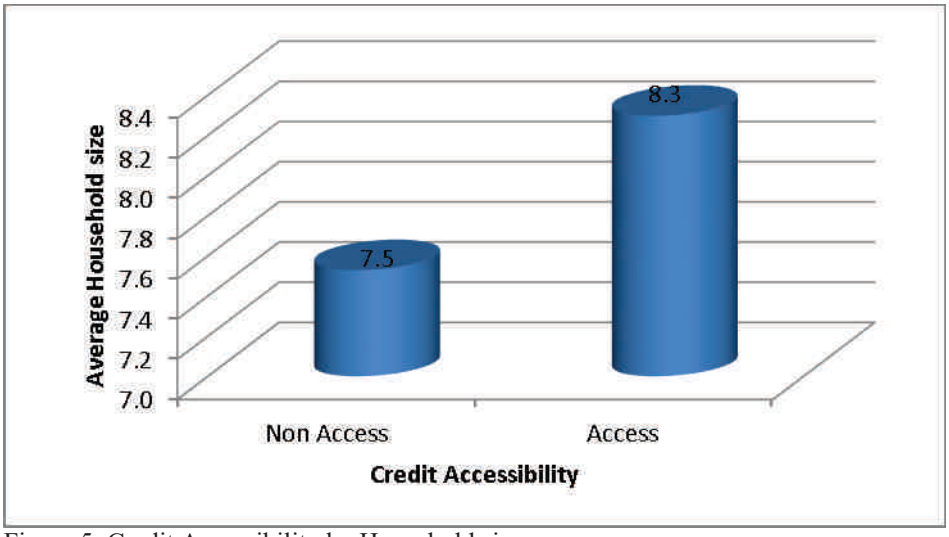

Figure 5: Credit Accessibility by Household size

3.11 Marital Status of Farmers and Agricultural credit Accessibility

The survey indicated that farmers who had greater access to agricultural credit were married while those who had less access to agricultural credit were not married. On the average, married farmers had GH¢97.00 while unmarried farmers had GH¢33.00 in terms of credit received. This means credit is mostly given to responsible farmers with the intention of secured repayment of loans.

3.12 Group Membership and Agricultural credit Accessibility

Farmers who were in group association received large amount of credit than those who were not in groups. On the average, farmers who were in group received GH¢ 190.00 while farmers who were not in group received GH¢ 4.00. This agrees with the result of table 1, that group and credit are positively correlated. Group has a magnitude of 0.783 and significant at 1 %, which means that the degree of association between group and credit is strong. It must be emphasized here that, farmers who received GH¢ 4 were those who received credit in the form of rice seeds. This implies that credit institutions prefer farmers in groups than those without any group since credit repayment becomes secured when farmers are in groups. This is consistent with the studies of Lukytaweti (2009) that, membership to economic association is a fundamental requirement for accessing credit by small borrowers because group-based lending is a way of circumventing adverse selection and moral hazard issues (Armendariz and Morduch, 2005).

3.13 Location of Farmers and Agricultural credit Accessibility

Farmers from Walewale received larger amount of credit than their Savelugu counterparts. Farmers from Walewale received GH¢231.00 while those from Savelugu-Nanton received GH¢13.00. This could be attributed to the fact Walewale is a bigger and more open place. This confirms the work of Oboh and Kushwaha (2009) that the farther away the residential distance of farmers from the bank; the larger is the loan sizes.

3.14 Farm size of Farmers and Agricultural credit Accessibility

Farmers with larger farm size received agricultural credit while those with smaller farm size had no agricultural credit. On the average, farmers who had access to agricultural credit had farm size of 3.5acres while those without agricultural credit had farm size of 2.5 acres. The difference in farm size is confirmed by the correlation coefficient of 0.27 which shows a weak association between farm size and credit accessibility,

though it is significant at 1 %. This is in line with CIMMTY (1993), where farmers with large farms are more likely to adopt new technologies than farmers with small farm size. This confirmed the findings of Emereole (2004) that increase in farm size necessarily requires the employment of more farm inputs which in turn require additional capital for their purchase.

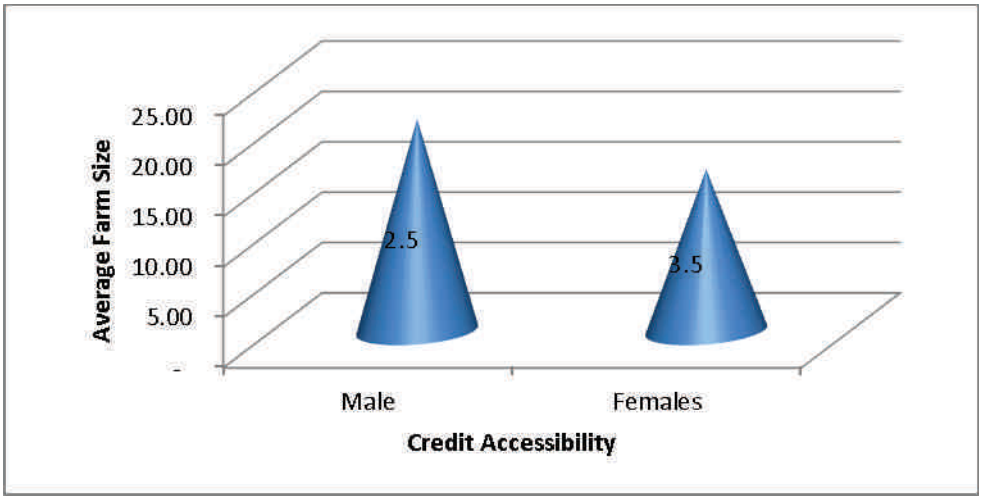

Fig 6: Credit Accessibility by Farm size

3.15 Total cost of Production and Agricultural credit Accessibility

There is a positive relationship between agricultural credit accessibility and total cost of production. On the average, farmers who had agricultural credit incurred an average cost of GH¢350.00 while farmers who did not have access to agricultural credit incurred a total cost of GH¢274.00. This implies that, farmers who made higher expenses in terms of production cost were those who received agricultural credit (Fig 7).

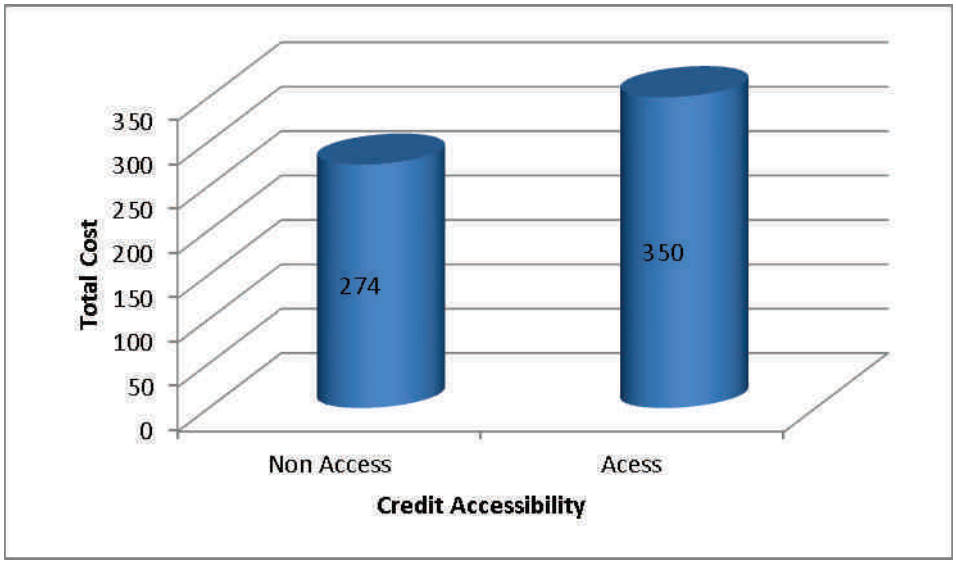

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Fig 7: Credit Accessibility by total cost

3.16 Cobb-Douglas Production Analysis

Table 2: Results of Cobb-Douglas Production Function

Variable	Parameter	Coefficient	Standard Error	T- Ratio	P[|T| > t]	Mean of X
Constant	β0	5.061	0.0947	53.424	.0000	
Farm Size	β1	0.952	0.101	9.363	.0000***	0.945
Fertilizer	β2	0.109	0.655	1.670	.0985*	1.075
Credit	β3	0.390	0.175	2.234	.0281**	2.161

Adjusted R- Squared 65%; Source: Field Survey data (2010)

*** Significant at 1% ** Significant at 5% *Significant at 10%

In table 2, the results of the estimated Cobb-Douglas production function are presented.
We notice that, all the variables are positive and significant, implying there is some relationship between the independents variables and output (dependent variable).The adjusted R- Square is 65 % which implies, the explanatory variables explain 65 % of the variations in the dependent variable output (Y).
Farm size is statistically significant at 1%, implying that it has significant effect on rice output. The coefficient for farm size is 0.952, which means that 100 % increase in acreage of land will add 95 % increase in output. Similarly, fertilizer (in bags) is statistically significant at 10%, implying it has significant effect on rice output. The coefficient for fertilizer is 0.109, this means that for every 100 % increase in fertilizer use will result in 11 % increase in output. Additionally, credit (GH¢) is statistically significant at 5%, implying it has
significant effect on output. The coefficient for credit is 0.390 this means that 100 % increase in amount of credit received will lead to 39 % increase in output.
This is depicted in fig 8 that farmers who received agricultural credit had as much as 43 bags of rice while farmers who did not access agricultural credit had 21 bags of rice. This confirms the significant effect of agricultural credit on rice output from the estimated Cobb-Douglas production function.

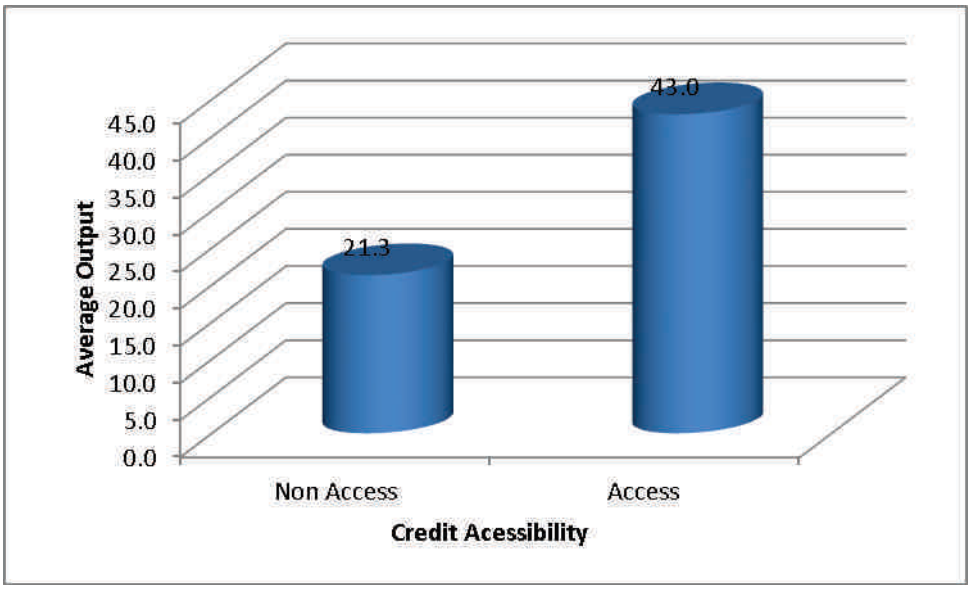

Figure 8: Credit Accessibility by output

3.17 Constraints of Agricultural credit accessibility
The following constraints to agricultural credit accessibility were discovered as follow:

- Most of the respondents interviewed indicated that the credit institutions charge exorbitant interest rate in addition to the commitment fee they pay. This is in consonance withVon-Pischike (1991) who earlier reported that, moneylenders generally charge exorbitant rates due to risks involved and in some cases they extract economic surplus provided by peasant labour, capital and possibly land.
- Another bottleneck indicated by respondents was that the credit institutions require the farmers to be in group so that repayment of loans can be secured.
- Similarly, most of the farmers indicated that they were not aware of the existence of credit institution in the locality.
- Also, most of the farmers said as a result of their low educational background they could not understand the terms and other conditions that are involved in the assessment process and as a result could not access the credit.
- Finally, the research indicated that most of the farmers could not access the credit mainly due to fear of indebtedness.

4. Conclusion
The study revealed that agricultural credit is indeed profitable and leads to increased production. A simple random technique was used to randomly sample 90 rice farmers from the two districts. The average yield of farmers from the two districts suggests that, output levels could be increased drastically if farmers had access to agricultural credit. The study shows that the mutual guarantee relied upon for loan/credit recovery

is good since it enables the farmers to access credit from the formal institutions without necessarily offering collaterals as guarantee for credit.

Also, access to credit by small scale farmers is good since it helps them afford basic inputs such as fertilizers and seeds among others. From the survey it came to light that agricultural credit accessibility is positively influenced by group membership, farm size and gender. Specifically females had greater average of credit than males.

However, rice production in the two districts is on a small scale largely due to inadequate productive resources. The study showed that, farmers faced challenges such as high interest rate, small credit size, unfavourable weather conditions and the fear of indebtedness due to unpredictable nature of the weather and the risky nature of farming.

Above all, majority of the farmers from Savelugu-Nanton lacked access to agricultural credit which serves as an impediment to their production

5. Recommendations

In the light of the above, the following recommendations are made:

1. Farmers should be sensitized on the existence of credit institutions, as well as their mode of operation.
2. Policy makers should institute measures to enable farmers market their produce to facilitate repayment of credit.
3. Farmers should be educated to realize the need for the determinants of agricultural credit accessibility in credit acquisition.
4. Credit institutions should institute measures to reduce interest rate and make credit acquisition process simple and repayment plan flexible to ease the problem of agricultural credit acquisition.
5. The amount of credit disbursed to farmers by credit institutions should be increased to meet production demands of farmers.
6. Credit institutions should educate and organize training programs for farmers on credit acquisition process and prudent use of agricultural credit.
7. Finally, it is suggested that, credit should be provided for farmers at the appropriate time in order to facilitate repayment.

Abbreviations: MoFA (Ministry of Food and Agriculture), OLS (Ordinary Leasst Square), ISSER (Institute of Statistical Social and Economic Research, ADB (Agricultural Development Bank), MASLOC (Medium and Small-Scale Loan Centre), MiDA (Millenium Development Authority), CIMMTY(Centro International de Mejoramieto de Maiz Y Trigo)

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